

1. INTRODUCTION

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1. INTRODUCTION

The mission of the CALFED Bay-Delta Program (Program or CALFED) is to develop a long-term comprehensive plan that will restore ecosystem health and improve water management for beneficial uses of the Bay-Delta system. The Program has identified six solution principles as fundamental guides for evaluating alternative solutions:

- ***Reduce conflicts in the system*** - Solutions will reduce major conflicts among beneficial uses of water.
- ***Be equitable*** - Solutions will focus on solving problems in all problem areas. Improvements for some problems will not be made without corresponding improvements for other problems.
- ***Be affordable*** - Solutions will be implementable and maintainable within the foreseeable resources of the Program and stakeholders.
- ***Be durable*** - Solutions will have political and economic staying power and will sustain the resources they were designed to protect and enhance.
- ***Be implementable*** - Solutions will have broad public acceptance and legal feasibility, and will be timely and relatively simple to implement compared with other alternatives.
- ***Result in no significant redirected impacts*** - Solutions will not solve problems in the Bay-Delta system by redirecting significant negative impacts, when viewed in their entirety, within the Bay-Delta or to other regions of California.

The mission of the CALFED Bay-Delta Program is to develop a long-term comprehensive plan that will restore ecosystem health and improve water management for beneficial uses of the Bay-Delta system.

The Program addresses problems in four resource areas: ecosystem quality, water quality, levee system integrity, and water supply reliability. Each resource area forms a component of the Bay-Delta solution and is being developed and evaluated at a programmatic level. Therefore, problems and corrective actions are described in a general manner sufficient to make broad decisions on Program direction. The complex and comprehensive nature of a Bay-Delta solution requires a composition of many different programs, projects, and actions that will be implemented over time.

The Program is being completed in three phases (Figure 1). Phase I of the Program began in June 1995 and was completed in August 1996. During this phase, three conceptual alternatives were developed to solve Bay-Delta problems. These conceptual alternatives all include Program components to comprehensively address



ecosystem restoration, water quality improvements, enhanced Delta levee system integrity, and increased water supply reliability.

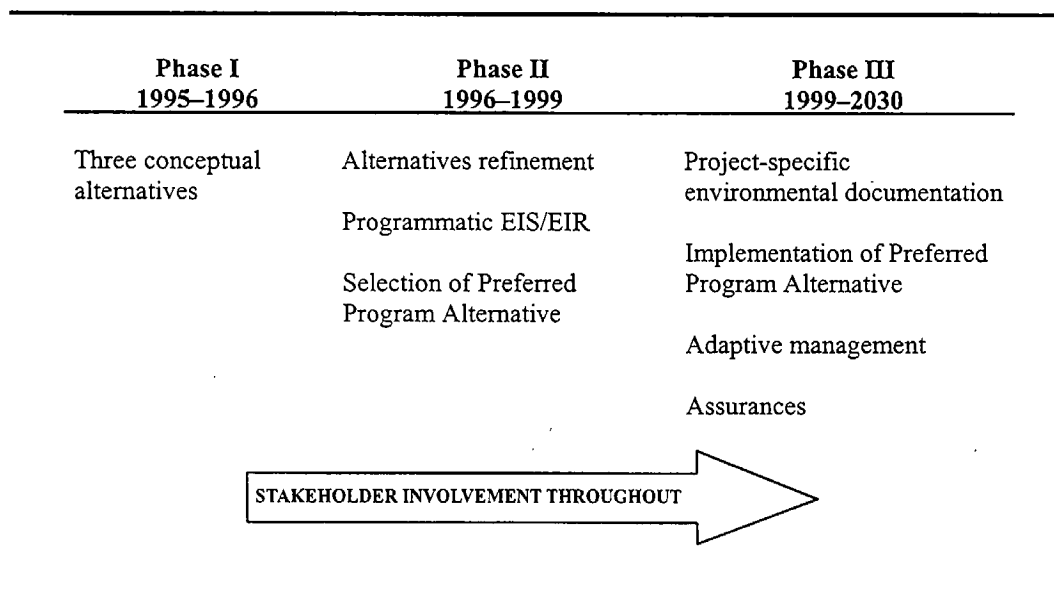


Figure 1. The Three Phases of the CALFED Bay-Delta Program

The Water Quality Program, like all components of the CALFED Program, is being developed and evaluated at a programmatic level. The Program is currently in what is referred to as Phase II, in which the CALFED agencies are developing a Preferred Program Alternative that will be subject to a comprehensive programmatic environmental review. This report describes both the long-term programmatic actions that are assessed in the June 1999 Draft Programmatic Environmental Impact Statement/Environmental Impact Report (EIS/EIR), as well as certain more specific actions that may be carried out during implementation of the Program. The programmatic actions in a long-term program of this scope necessarily are described generally and without detailed site-specific information. More detailed information will be analyzed as the Program is refined in its next phase.

Implementation of Phase III is expected to begin in 2000, after the Programmatic EIS/EIR is finalized and adopted. Because of the size and complexity of the alternatives, the Program likely will be implemented over a period of 30 or more years. Program actions will be refined as implementation proceeds, initially focusing on the first 7 years (Stage 1). Subsequent site-specific proposals that involve potentially significant environmental impacts will require site-specific environmental review that tiers off the Programmatic EIS/EIR. Some actions, such as construction of treatment facilities and mine remediation, also will be subject to permit approval

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of treatment facilities and mine remediation, also will be subject to permit approval from regulatory agencies. Figure 2 shows the three phases of the Water Quality Program and associated program documents.

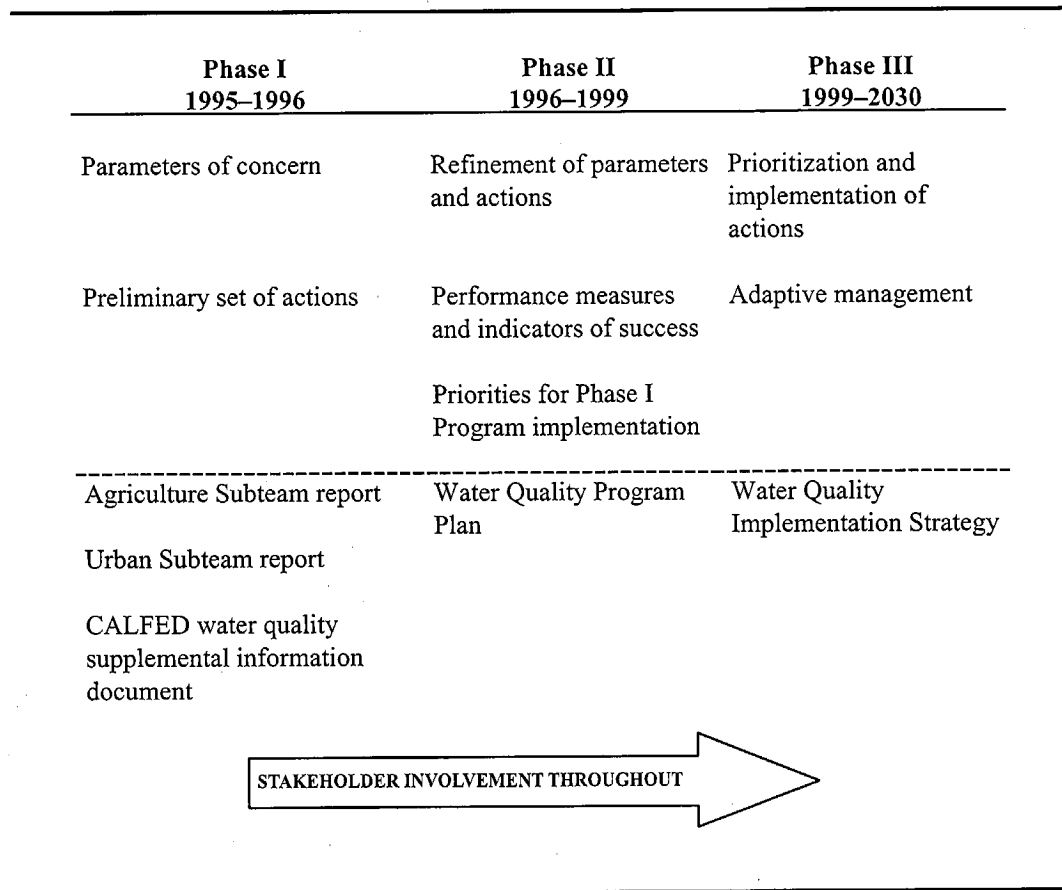


Figure 2. The Three Phases of the Water Quality Program and Associated Program Documents

The CALFED Program's goal for water quality is to provide good water quality for environmental, agricultural, drinking water, industrial, and recreational beneficial uses. To achieve this goal, CALFED has developed and is implementing a Water Quality Program. The purpose of this report is to detail the results of Water Quality Program activities conducted during Phase II of the Program and to highlight those activities planned in Phase III.

During Phase I of the Water Quality Program, parameters of concern to beneficial uses were identified, and a preliminary set of actions to address those parameters were developed. During Phase II, currently underway, the list of parameters of concern and programmatic water quality actions were refined, performance

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identified, and more general plans were formulated for later implementation stages.

CALFED staff recognize that the necessity to formulate the Water Quality Program at a level of detail appropriate to a programmatic environmental document leaves many questions unanswered. Water quality problems are not spelled out in great detail, and the actions to address the problems are described in general terms. At the programmatic level of detail, the identified actions constitute a commitment to improving water quality. In many cases, this commitment cannot be fulfilled until additional study, evaluation, feasibility determination, and pilot-scale implementations are accomplished. These activities must be relegated to Phase III of the process beginning in 2000, but the intent at this stage of the program is to establish an adequate basis for project-specific work to come later.

1.1 PURPOSE AND NEED

The value of water is determined by its potential uses. In turn, the uses that can be made of water are determined by its quality. Water of degraded quality may not adequately support the aquatic ecosystem because it may not contain sufficient oxygen; because it may contain particles that suffocate bottom-dwelling organisms; or because it may be poisonous to aquatic organisms or to other species, including humans, that consume aquatic organisms. Salinity and other constituents in the water may render it unsuitable for many uses, such as agricultural and landscape irrigation, industrial processes, and drinking. Also, water contaminated by pathogens, such as viruses, bacteria, and protozoans, may cause illnesses in animals and humans who consume the water. Clearly, therefore, if the Bay-Delta ecosystem is to be restored and conflict among beneficial users of the estuary is to be reduced, the quality of the waters must be suitable for the ecological and human uses of the resource.

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The purpose of the CALFED Water Quality Program is to improve the quality of the waters of the Sacramento-San Joaquin Delta estuary for all beneficial uses (including domestic, industrial, agricultural, recreation, and aquatic habitat). Because species dependent on the Delta are affected by upstream water quality conditions in some areas, the scope of the Water Quality Program also includes watershed actions to reduce water quality impacts on these species.

The need for action to correct water quality problems in the Delta estuary and its watersheds arises from recognition that water quality degradation negatively affects, or has the potential to negatively affect, a number of beneficial uses of the waters. Section 303(d) of the federal Clean Water Act (CWA) requires states to

identify water bodies with impaired quality with respect to supporting beneficial uses. This process has resulted in a number of water bodies in the Bay-Delta estuary and its tributaries being listed as impaired. Therefore, an important component of correcting the overall problems of the Delta estuary is undertaking actions to effectively reduce the toxicity of aquatic habitats and reduce constituents, such as salinity, that affect the usability of Delta water supplies.

1.2 VISION

The vision for the CALFED Water Quality Program is to create water quality conditions that fully support a healthy and diverse ecosystem and the multiplicity of human uses of the waters. To realize this vision, CALFED will strive to continually improve the quality of waters of the San Francisco Bay-Delta estuary until no ecological, drinking water, or other beneficial uses of the waters are impaired by water quality problems, and to maintain this quality once achieved.

With respect to ecosystem values, the Water Quality Program envisions waters and sediments of the estuary free of toxicity to phytoplankton, zooplankton, benthic invertebrate organisms, and fish communities that inhabit the Delta estuary. Protection from accidental or intentional toxic spills would be an important feature of assurance of toxicity-free conditions. Oxygen levels in the waters of the estuary would, at all times, contain sufficient dissolved oxygen (DO) to avoid stress to aquatic organisms and to make all estuary habitats livable and attractive to aquatic species. Suspended solids loadings in the estuary would be appropriate to enable adequate recruitment of bed sediments to support a healthy and diverse community of benthic organisms, would produce water column turbidity conditions that are optimal, and would provide suspended solids in size ranges and concentrations that would avoid low DO and low oxygen exchange conditions in channel bottoms.

Waters of the estuary supplied to agricultural uses would be sufficiently low in boron to avoid toxicity to sensitive plant species, with an appropriate sodium adsorption ratio to avoid soil impermeability, and be sufficiently low in dissolved minerals (salinity) to:

- Avoid toxicity to plants,
- Promote efficient water use by enabling multiple stages of tailwater recycling,

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- Reduce salt loadings in agricultural drainage to eliminate impacts on downstream uses, and
- Attain long-term salt balance.

Delta waters used for industrial purposes would be sufficiently low in mineral concentrations to enable efficient water use and closed-loop recycling of process water; and to reduce costs from accretion of mineral deposits in piping, cooling, heating, and other industrial equipment. Industrial water supplies from the Delta also would be sufficiently low in other constituents, such as metals and nutrients, to avoid the necessity for costly pretreatment in order to render the waters suitable for incorporation into products to be ingested and other industrial uses.

Recreational uses of the waters of the Bay-Delta estuary will be enhanced by reduction of disease-causing organisms through better protection of Delta waters from animal and human contamination. Aesthetic values will be enhanced by reduction in nuisance algae blooms that are unsightly, cause odors, obstruct navigation, and foul boat bottoms.

With respect to drinking water uses, waters supplied from the Delta would be protected from releases of pathogens (e.g., viruses, bacteria, and protozoa) from sources such as recreational boating, livestock grazing, stormwater runoff, sewage spills, and wastewater discharges. Watershed protection measures also would be applied to reduce known and potential sources of turbidity, nutrients, and toxic substances that contribute to reducing the safety of drinking water supplies and the reliability of water treatment. Bromide and organic carbon concentrations would be present in drinking water supplies taken from the Delta in concentrations sufficiently low as to enable meeting current and prospective drinking water regulations. Concentrations of all constituents and variability in source water quality would be sufficiently low as to enable water utilities to provide a quality of drinking water that is the equal of any in the world with respect to safety, palatability, and overall quality. Because of its high level of source protection and competent treatment, drinking water from the Delta would never be associated with outbreaks of waterborne diseases.

Municipal water supplies from the Delta would be sufficiently low in dissolved mineral content to attain record high-efficiency water use.

- Water supplies low in salinity can support multiple recyclings, thus greatly enhancing efficiency of water use and reducing dependency on importing water supplies from the Delta.
- Low-salinity water from the Delta would increase the flexibility for meeting water needs by enabling blending with alternate supplies, such as groundwater (some of which is higher in dissolved minerals than surface

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waters), and with other surface water supplies of lower mineral quality. The effect of this increased flexibility would reduce dependency on importing water supplies from the Delta.

The vision for water quality also includes being able to provide the critical benefits of water quality at a cost that is affordable to Californians generally and to the individual beneficiaries of the water resources of the Delta estuary.

The CALFED vision can be realized only with the help of the involved agencies and stakeholders. Its attainment must be an evolutionary process. CALFED has chosen the term “adaptive management” to refer to the concepts that (1) much remains to be learned about the Bay-Delta estuary and about what can be done to correct its problems, and (2) decisions will need to be continuously made over the next 30 years as the Program is implemented. The most important part of the water quality vision is that continual improvement in water quality will be achieved by maintaining the Water Quality Technical Group as the primary vehicle through which the program is guided in the coming years. Therefore, although it is not possible to predict the exact directions of the Program, maintaining close involvement of the interested parties will provide the best possible assurance that correct decisions will be made while CALFED solution principles are upheld.

Although not applicable to every situation that will be encountered by the CALFED Water Quality Program, the program endorses the following solution methodology:

- Use existing regulatory water quality standards as goals where applicable.
- Devote primary attention on defensible problem identification.
- Implement comprehensive data collection and focused research to address water quality issues of concern.
- Develop and implement analytical tools (mathematical models) to provide predictive capacity for management efforts.
- Implement demonstration projects to validate management effectiveness.
- Develop strategic plans through involvement and education of all affected parties.
- Develop and implement management tools to address water quality problems.
- Support other efforts to address identified problems.

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